

### **REMARKS**

This response is intended as a full and complete response to the Office Action dated April 17, 2006. In view of the amendments and the following discussion, the Applicants believe that all claims are in allowable form.

### **DOUBLE PATENTING**

Claims 1-15, 17, and 21-22 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 6,806,095. To expedite examination, Applicants submit a Terminal Disclaimer under 37 CFR 1.321(c) disclaiming the terminal portion of any patent that should issue from the present application so that such a patent would expire no later than the expiration date of U.S. Patent No. 6,806,095.

Claims 1-15, 17, and 21-22 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 and 9-20 of copending Application No. 10/143,397. The Applicants provisionally agree to file a terminal disclaimer to resolve the present double patenting rejection if and when one of the applications is finally allowed. In accordance with MPEP §804(I)(B), "if the 'provisional' double patenting rejection in one application is the only rejection remaining in that application, the examiner should then withdraw that rejection and permit the application to issue as a patent, thereby converting the 'provisional' double patenting rejection in the other application(s) into a double patenting rejection at the time one application issues as a patent." As such, Applicants will file a terminal disclaimer in the future, if necessary.

### **CLAIM REJECTIONS**

#### **A. 35 U.S.C. §103 Claims 1-4, 6, 8, 12-18 and 21-22**

Claims 1-4, 6, 8, 12-18 and 21-22 stand rejected as being unpatentable over United States Patent Application Publication No. US 2001/0055852 A1, published December 27, 2001, to *Moise, et al.* (hereinafter referred to as "*Moise*") in view of

United States Patent No. 6, 790, 755 issued September 14, 2004 to *Jeon* (hereinafter referred to as "*Jeon*"). The Applicants respectfully disagree.

Independent claims 1, 12, 17 and 21 recite elements not taught, shown or suggested by the combination of *Moise* and *Jeon*. *Moise* teaches to etch PZT, BST, or SBT using Cl<sub>2</sub>, O<sub>2</sub>, CF<sub>4</sub>, and Ar. The O<sub>2</sub> gas may be interchangeable to CO gas, as listed on Table in paragraph 160. However, *Moise* does not teach, show or suggest a method of plasma etching, using carbon monoxide and a halogen gas, a layer of dielectric material comprising at least one of HfO<sub>2</sub>, ZrO<sub>2</sub>, ZrSiO<sub>2</sub>, HfSiO<sub>2</sub>, and TaO<sub>2</sub>, as recited by claim 1, 12 and 17 and 21.

The Applicants submit that *Moise* uses particular gases to etch compounds composed by different metals, such as lead zirconate titanate (PZT) material. PZT is a compound and/or alloy formed by at least *three metals*, Pb, Zr and Ti. PZT compounds may be interchangeably doped with different metals, such as Hf, Ta, Mn, Fe, or may be modified with different component ratios, such as Zr and Ti component ratios. However, *Moise* does not teach or suggest that the entire PZT compound may be replace by Hf or other material. Compounds having different compositions have unique and particular material characteristics, and therefore require the selection of particular etchant gases to promote etching while obtaining a desired result. As known to those skilled in the art, etchant gas composition and process parameters are most important characteristics of an etch process for etching selected and particular intended materials.

Here, *Moise* teaches using Cl<sub>2</sub>, O<sub>2</sub>, CF<sub>4</sub>, and Ar to etch PZT or SBT materials. These materials are different and have material characteristics than HfO<sub>2</sub>, ZrO<sub>2</sub>, ZrSiO<sub>2</sub>, HfSiO<sub>2</sub>, and TaO<sub>2</sub>, as claimed by the Applicants. The Applicants submit that the teaching in *Moise* cannot be utilized to anticipate in the present application because *Moise* is intended to etch materials different from the materials claimed by the Applicants.

*Jeon* teaches using PZT, BST, HfO<sub>2</sub>, as high-k materials. However, *Jeon* does not teach a particular gas mixture utilized to etch each high-k material as stated above. Combining the high-k materials suggested by *Jeon* into the etch process as taught by *Moise* would not necessarily enable and yield a workable etch process. Unsupported

conclusions and impermissible hindsight may not provide a proper basis to support a rejection based on *prima facie* obviousness. As such, the Examiner is using impermissible hindsight to find a suggestion of the combination of elements as claimed. Therefore, the combination of *Moise* and *Jeon* would not yield an etch process using carbon monoxide and a halogen gas, a layer of dielectric material comprising at least one of HfO<sub>2</sub>, ZrO<sub>2</sub>, ZrSiO<sub>2</sub>, HfSiO<sub>2</sub>, and TaO<sub>2</sub>, as recited by claim 1, 12 and 17 and 21.

Thus, the Applicants submit that independent claim 1, 12, 17 and 21 and all depend therefrom are patentable over *Moise* in view of *Jeon*. Accordingly, the Applicants respectfully request the rejection be withdrawn and claims allowed.

**B. 35 U.S.C. §103****Claim 7**

Claim 7 stands rejected as being unpatentable over *Moise* in view of United *Jeon* and further in view of United State Patent No., 6,492,222 issued December 10, 2002 to *Xing* (hereinafter referred to as "*Xing*"). Applicants respectfully disagree.

Independent claim 1 recites elements not taught or suggested by the combination of *Moise*, *Jeon* and *Xing*. The teachings of *Moise* and *Jeon* have been disclosed above. *Xing* teaches a method for dry etching a PZT layer. However, *Xing* does not teach or suggest a modification to *Moise* and *Jeon* that would yield plasma etching a substrate having a layer of dielectric material is at least one of HfO<sub>2</sub>, ZrO<sub>2</sub>, ZrSiO<sub>2</sub>, HfSiO<sub>2</sub>, and TaO<sub>2</sub>, by providing a process gas comprising carbon monoxide and a halogen containing gas, as recited by claim 1. As such, a *prima facie* case of obviousness has not established as the references fail to teach or suggest all the claimed elements.

Thus, the Applicants submit that dependent claim 7, that depends on claim 1, is patentable over the combination of *Moise*, *Jeon* and *Xing*. Accordingly, the Applicants respectfully request the rejection be withdrawn and claim allowed.

**C. 35 U.S.C. §103 Claim 9**

Claim 9 stands rejected as being unpatentable over *Moise* in view of United *Jeon* and further in view of United State Patent No., 6,764,792 issued July 20, 2004 to *Fujikawa, et al.*, (hereinafter referred to as "*Fujikawa*"). The Applicants respectfully disagree.

Independent claim 1 recites elements not taught or suggested by the combination of *Moise*, *Jeon* and *Fujikawa*. The teachings of *Moise* and *Jeon* have been disclosed above. *Fujikawa* teaches a method for etching a hardmask layer. However, *Fujikawa* does not teach or suggest a modification to *Moise* and *Jeon* that would yield plasma etching a substrate having a layer of dielectric material is at least one of  $\text{HfO}_2$ ,  $\text{ZrO}_2$ ,  $\text{ZrSiO}_2$ ,  $\text{HfSiO}_2$ , and  $\text{TaO}_2$ , by providing a process gas comprising carbon monoxide and a halogen containing gas, as recited by claim 1. As such, a *prima facie* case of obviousness has not established as the references fail to teach or suggest all the claimed elements.

Thus, the Applicants submit that dependent claim 9, that depends on claim 1, is patentable over the combination of *Moise*, *Jeon* and *Fujikawa*. Accordingly, the Applicants respectfully request the rejection be withdrawn and claim allowed.

**D. 35 U.S.C. §103 Claim 10**

Claim 10 stands rejected as being unpatentable over *Moise* in view of United *Jeon* and further in view of United State Patent No., 2002/0142609 issued October 3, 2004 to *Hart, et al.*, (hereinafter referred to as "*Hart*"). The Applicants respectfully disagree.

Independent claim 1 recites elements not taught or suggested by the combination of *Moise*, *Jeon* and *Hart*. The teachings of *Moise* and *Jeon* have been disclosed above. *Hart* teaches a method for etching a metal-oxide layer. However, *Hart* does not teach or suggest a modification to *Moise* and *Jeon* that would yield plasma etching a substrate having a layer of dielectric material is at least one of  $\text{HfO}_2$ ,  $\text{ZrO}_2$ ,  $\text{ZrSiO}_2$ ,  $\text{HfSiO}_2$ , and  $\text{TaO}_2$ , by providing a process gas comprising carbon monoxide and a halogen containing gas, as recited by claim 1. As such, a *prima facie* case of

obviousness has not established as the references fail to teach or suggest all the claimed elements.

Thus, the Applicants submit that dependent claim 10, that depends on claim 1, is patentable over the combination of *Moise*, *Jeon* and *Hart*. Accordingly, the Applicants respectfully request the rejection be withdrawn and claim allowed.

### ALLOWED CLAIMS

The Applicants thank the Examiner for the allowability of claims 5 and 11 if rewritten in independent form to include all the limitations of the base claims. However, in light of the reasons set forth above, the Applicants submit that all claims are allowable.

### CONCLUSION

Thus, the Applicants submit that all claims now pending are in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issuance are earnestly solicited.

If, however, the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Mr. Keith Taboada at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

July 11, 2006

  
Keith P. TABOADA  
Attorney Reg. No. 45,150  
(732) 530-9404

Patterson & Sheridan, LLP  
595 Shrewsbury Avenue  
Suite 100  
Shrewsbury, NJ 07702